2017 Science Olympiad Cobra Invitational – Wind Power Test Answers

1. e
2. A secondary energy source is generated from a primary source or serves as a carrier of energy derived from a primary source.
3. e
4. b
5. ecabd
6. e
7. false
8. true
9. false
10. false
11. true
12. false
13. hawt
14. vawt
15. vawt
16. hawt
17. d
18. b
19. 2 blade: lighter, cheaper, easier to install

3 blade: more efficient given same wind conditions, more dynamically balanced

1. P = ½ ρAv3 = 21335.8 W
2. P = 0.593(21335.8) = 12652 W
3. P = IV = 120\*15 = 1800 W; Cp = 12652/21335.8 = 0.16
4. Energy sources such as solar, wind, and hydropower are not consistently available to meet all demand and at the same time can be in oversupply. Storage helps balance supply with demand.
5. Mechanical: flywheel, gravitational pumped storage

Chemical: battery, fuel cell

Thermal: solar thermal collectors on rooftops

1. (100-62)/100 = 38/100 = 0.38 or 38%
2. 38-36/38 = 5.3%
3. Lightbulb – thermal energy/heat loss from the bulb.
4. Choose another type of lightbulb besides incandescent, which does not radiate as much heat ex. LED or fluorescent